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## MANAGEMENT OF DEGENERATIVE JOINT DISEASE IN AN ADULT CAPTIVE SLOTH BEAR (*Melursus ursinus*)

Arun A. Sha<sup>1</sup>, Riya Bakde<sup>2</sup> and Adhithyan N.K.<sup>2\*</sup>

<sup>1</sup>Director -Research & Veterinary Operations, <sup>2</sup>Wildlife Veterinary Officer  
Bannerghatta Bear Rescue Centre, Wildlife SOS.  
Corresponding author: [adhithyan@wildlifesos.org](mailto:adhithyan@wildlifesos.org)

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### ABSTRACT

Degenerative joint diseases are commonly encountered in pet practice, but reports among the wild counterparts are few. Management of joint disorders in Sloth bears requires in-depth studies to understand the factors associated with them. The present case reports a 16-year-old rescued dancing male sloth bear housed at the lifetime care facility of Bannerghatta bear rescue centre, showing difficulty in movement and gait abnormalities. The bear was immobilized using xylazine-ketamine combination. Upon general health check-up, blood samples were collected, and complete radiography was performed. Hematobiochemical analysis revealed no significant abnormalities. A series of whole pelvic imaging showed irregular bone density and fragmentation of the femur head and neck and widening joint space indicative of bilateral osteoarthritis of coxo-femoral joint. The bear was supplemented with a joint supplement along with calcium-phosphorus suspension for a period of 3

months. Enrichment activities were done as a means of physiotherapy. The sloth bear showed notable progress with increased mobility and gait pattern. Diagnostic imaging as a tool for early diagnosis of orthopaedic disorders in sloth bears coupled with therapeutics and physiotherapy needs to be further exploited for the betterment of the captively housed wild animals.

**Keywords:** Degenerative joint disease, Osteoarthritis, Sloth bear, Diagnosis, Treatment

### INTRODUCTION

Osteoarthritis (OA) or degenerative joint disease (DJD) is a multifactorial, inherited, polygenic disorder involving the synovium, articular cartilage and the underlying bone which can be secondary to congenital developmental abnormalities, instability of the joint or traumatic injuries (Henrotin *et al.*, 2005; Aragon *et al.*, 2007; McCarthy *et al.*, 2007; Runge *et al.*, 2010; Ohlerth *et al.*, 2019). Retrospective studies describing the prevalence of OA in dogs

have been frequently reported with very few similar studies in wild animals (Rothschild *et al.*, 1994; Rothschild *et al.*, 1999; Kelly and Murice, 2011 and Selvaraj *et al.*, 2017). Palaeontological investigations on the preserved skeleton specimens of different species of bears reported arthritis as a common finding in the Ursidae family (Fox, 1939; Greer, 1977; Kompanje *et al.*, 2000). Radiographic evidence suggestive of osteoarthritis was reported in brown bear (*Ursus arctos*), black bear (*Ursus americanus*), polar bear (*Ursus maritimus*), sun bear (*Helarctos malayanus*) by Follmi (2005) and Aminkov *et al.* (2018) with only one such incidence been reported in sloth bear (*Melursus ursinus*) (Selvaraj *et al.*, 2017). Sloth bears rescued from the barbaric dancing bear tradition may be prone to OA or DJD owing to the unhygienic and stressful conditions that they were raised in. These bears were trained by the Kalandar community using extremely harsh methods with complete lack of proper nutrition and veterinary care (Selvaraj *et al.*, 2017, Sandilya, 2019). Besides, geriatric sloth bears often develop arthritic joints consistent with degenerative joint disease (Sun bear and Sloth bear care manual, 2019). The present paper describes the diagnosis and therapeutic management of bilateral coxo-femoral osteoarthritis in a rescued dancing male sloth bear.

## MATERIAL AND METHODS

A 16-year-old captive male dancing sloth bear housed under the lifetime care facility of Bannerghatta bear rescue centre was showing recurrent episodes of hind limb lameness, gait abnormalities and reduced mobility. The sloth bear was reluctant during physical activities such as climbing trees and hammocks present in his socialisation pen. Upon no improvement after preliminary treatment, the bear was sedated for general health examination using xylazine-ketamine combination @ 2mg/kg and 5mg/kg, respectively. Complete radiography of the pelvic region (Fig. 1 and 2) was performed along with blood sampling for laboratory analysis.

Therapeutic management of osteoarthritis was attempted by supplementing the sloth bear with chondroitin sulphate tablets (Vendisc®) coupled with calcium and phosphorus suspension for a period of 3 months. In addition, the sloth bear was shifted to a separate area with built in physical structures as a means of providing exercise.

## RESULTS AND DISCUSSION

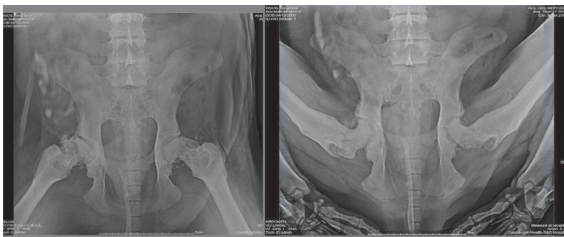
Hemato-biochemical analysis revealed no significant abnormalities whereas radiographic examination of the pelvic region showed bilateral degenerative changes in the coxo-femoral joint (Fig. 3).



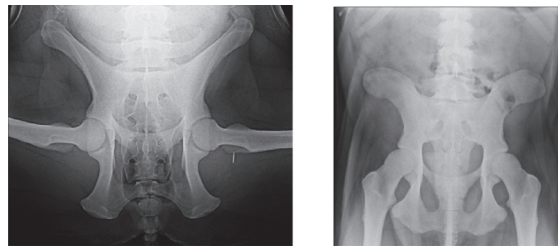
**Fig. 1:** Sloth bear immobilized for radiographic examination.



**Fig. 2:** Sloth bear positioned (VD view) for radiographic examination.



**Fig. 3:** Ventro-dorsal radiographs showing bilateral osteoarthritis of coxo-femoral joints.



**Fig 4:** Ventro-dorsal radiographs of normal hip joint in an adult sloth bear

Remodelling and osteolytic changes of both the femoral heads with flattening of acetabular rim and widened joint space were also evident. The radiographs also showed irregular bone density and fragmentation of the femoral head and neck.

After the course of treatment with the joint supplements, (chondroitin and glucosamine) the bear showed tremendous improvement in activity and mobility. The stress level of the animal had reduced, animal started normal feeding pattern and was showing normal appetite. The sloth bear started involving in enrichment structures and activities like climbing and digging burrows. Serum ALP level showed a slight reduction, and the Haematological parameters were normalised (compared

to high HCT and total protein values associated with less food and water intake). Osteoarthritis or Degenerative joint disease is commonly reported in dogs with limited literature available in their wild counterparts. (Rothschild *et al.*,1999; Kelly and Murice, 2011; Follmi, 2005; Aminkov *et al.*,2018). The progression of osteoarthritis can be slow and dependent on several components such as genetics as well as environmental factors. External stressors or traumatic injuries affecting the weight bearing capacity of the subluxated hip joint may damage the articular cartilage and initiate an inflammatory process subsequently leading to subchondral sclerosis and remodelling of the joint. (Smith *et al.*,2001; Schachner and Lopez,

2015; Iknega *et al.*,2019). Follomi, 2005 and Aminkov *et al.*,2018 radiographically examined bears with gait abnormality and lameness and reported osteoarthritis as the predominant findings in the affected bears. Management of osteoarthritis by supplementation with non-steroidal anti-inflammatory drugs, steroids and addition of joint supplements containing chondroitin sulphate and glucosamine hydrochloride has been shown to decrease cartilage degradation and alleviate the inflammation and pain (Henroitin *et al.*,2005; Aragon *et al.*,2007; Rock, 2007; Oke, 2009; Rychel, 2010; Comblain *et al.*,2016, Sun bear and Sloth bear Care Manual, 2019). Physical rehabilitation can be practised to improve gait function and reduce musculoskeletal pain associated with osteoarthritis. Laser therapy, thermotherapy, transcutaneous electrical nerve stimulation and acupuncture in conjunction with weight management (Rychel, 2010; Schachner and Lopez, 2015) may have positive outcome in arthritic animals. Designing of suitable enrichment structures like a wobble tree with a feeder and tree with honey dispenser may help in assessing the functioning of hip joint and vertebrae of the individual bears (Kitchener and Macdonald, 2002 and Law and Reid, 2010) coupled with routine radiographic examination of the bears may increase their longevity in captivity (Sun bear and Sloth bear care manual, 2019).

## **SUMMARY**

Osteoarthritis or degenerative joint disease is a polygenic and multifactorial developmental disorder that requires a multivariate therapeutic approach comprising of nutraceutical medications and physical therapy. In the present study, a rescued dancing sloth bear was radiographically diagnosed with bilateral coxo-femoral osteoarthritis. The affected bear was supplemented with chondroitin sulphate tablets along with calcium phosphorous suspension. Besides therapy, the bear was subjected to enrichment activities that involved honey or peanut butter pasted on tree barks and rocks thus providing him with enough physical exercise. In addition, routine radiographic examination of the sloth bears as a part of their general health examination was made mandatory for better management of geriatric bears under captivity.

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